



Successful Annular Isolation using PWC[®] on Coil Tubing: A key element of the 'Road to Rigless'

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SPE Aberdeen, 6-7th June 2023

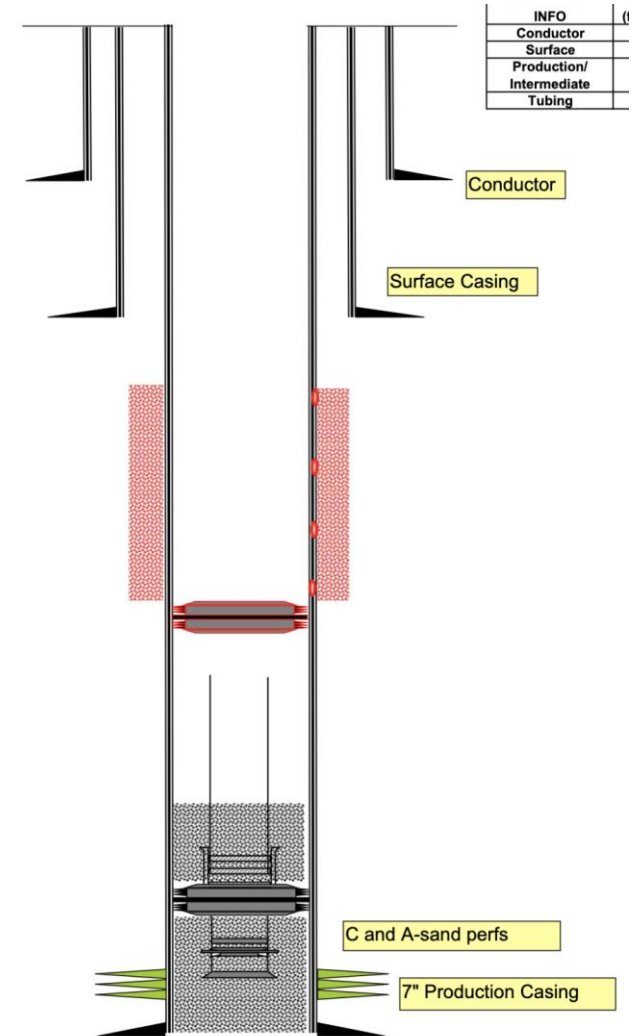
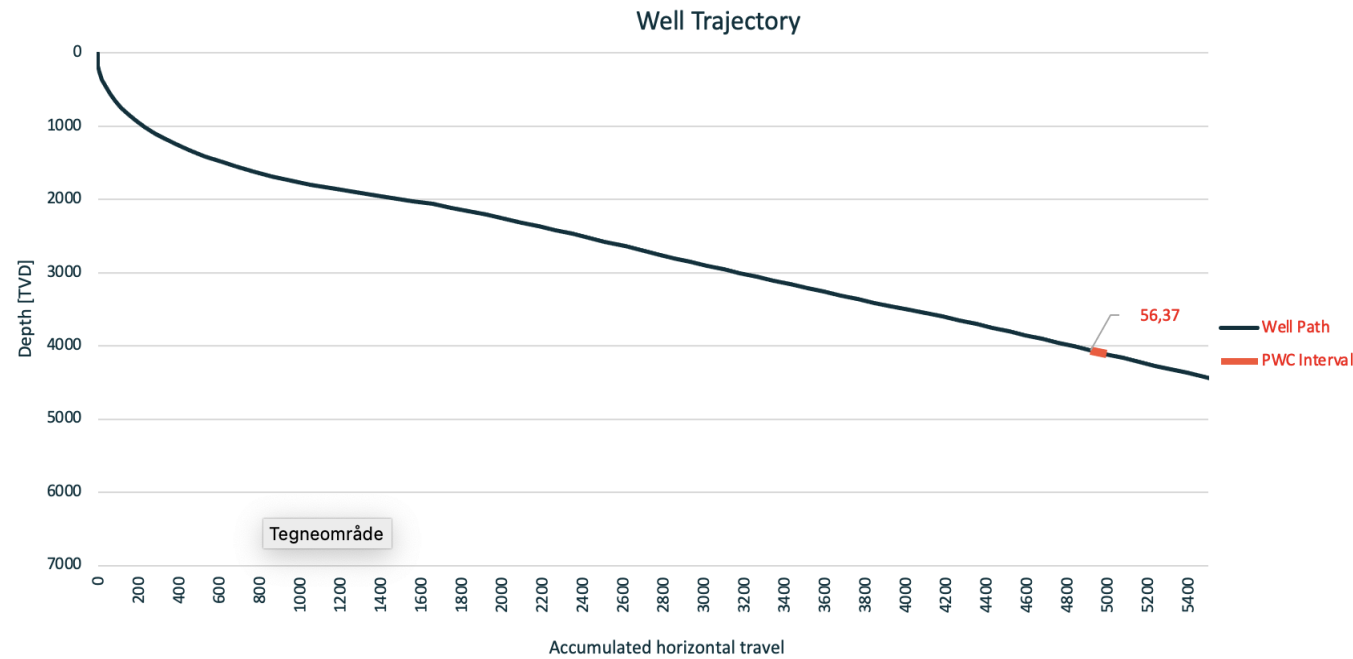
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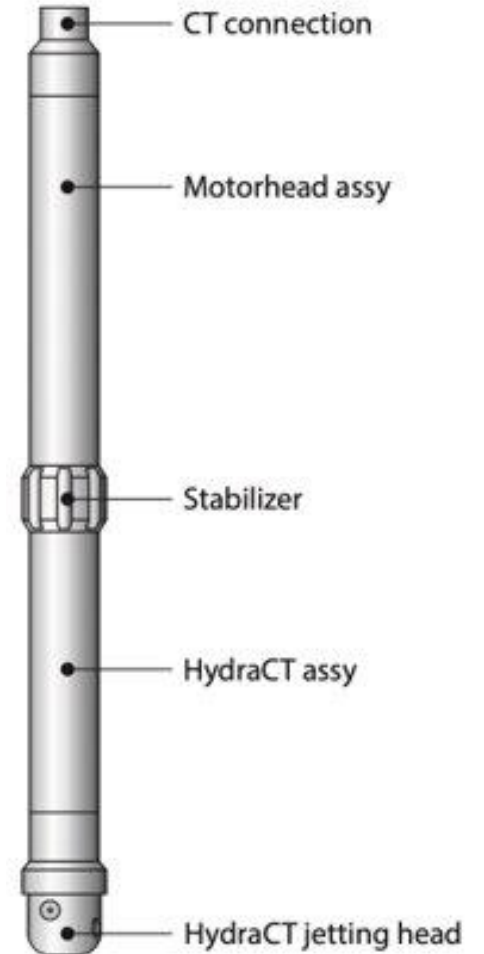


Barrier Requirement

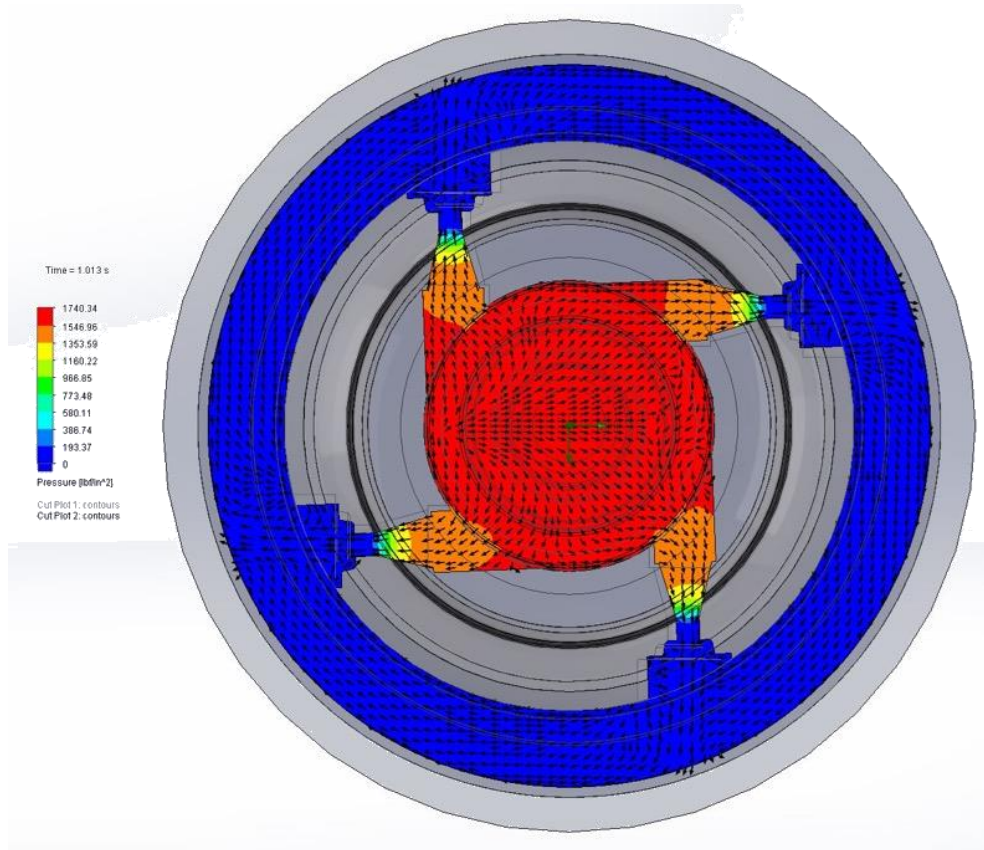
- Land Operations
- High Rig Costs & Limited Availability
- Slot Recovery Reservoir Isolation
- 150' Annular Barrier required behind 7" Casing
- Opportunity to reduce overall cost using Coiled Tubing



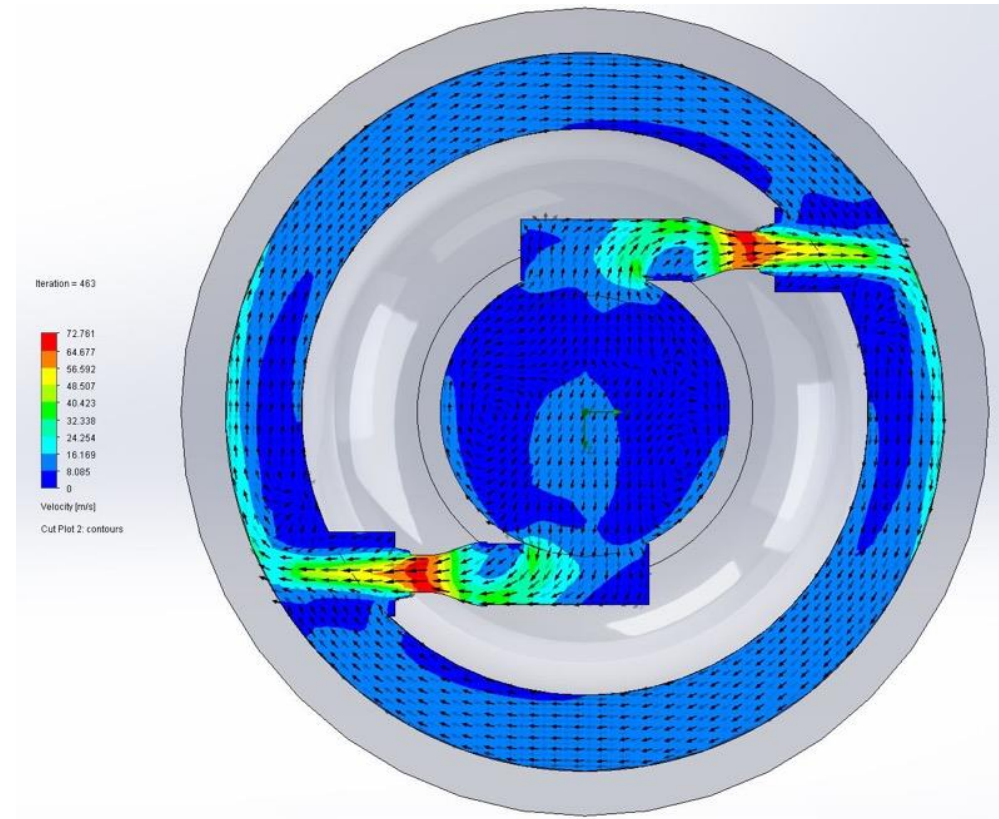
- Perforate Casing with 4,72” HSD Guns run on E-Line
- PWC® BHA adapted for Coiled Tubing
- Swivel Mechanism set to ~60 rpm rotation



Wash Mode



Cement Mode



Challenges

- Limited on flow rates
- Low annular velocity to carry debris out of well
- Cement design



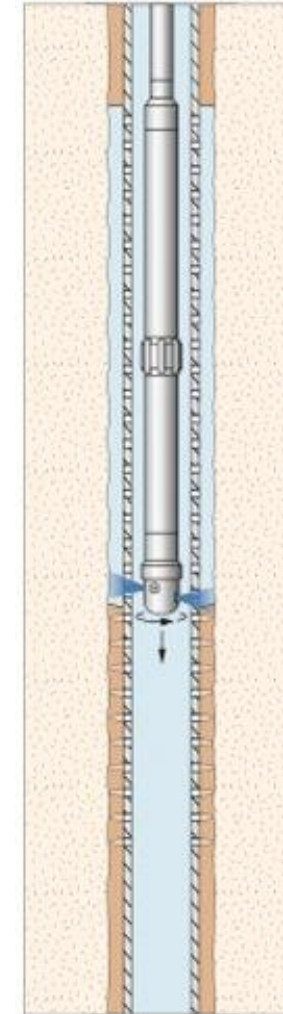
Solutions & Mitigations

- Sweeps to surface
- High viscous pills
- Let larger debris fall into rathole
- Special coil tubing cement design
- Short coil tubing reel used

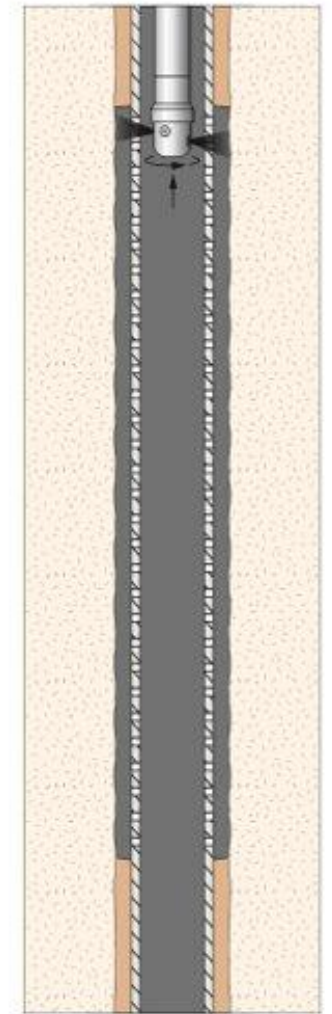
Key Operational Programme Steps

- RIH & Perforate 150' with 4,72" guns on E-Line: EHD 0,83"
- Circulate out gun gas
- RIH PWC® BHA on 2 3/8" Coil Tubing
- Wash across perforations with seawater at 3.5bpm using Jetting Ports
- Activate Cement Jetting Ports
- Pump 16 ppg Cement at 1,65 bpm
- Pump and Pull (with Swivel rotation) across Perforations
- At 150' above top perforation, circulate out excess cement
- Tag and Pressure Test cement in wellbore
- Drill out and log cement quality for Verification

Wash perforated section from top to bottom



Jet cement across perforated section from bottom to top



Taken from System Acceptance tests conducted at Ullrig Test Well – supported by TotalEnergies



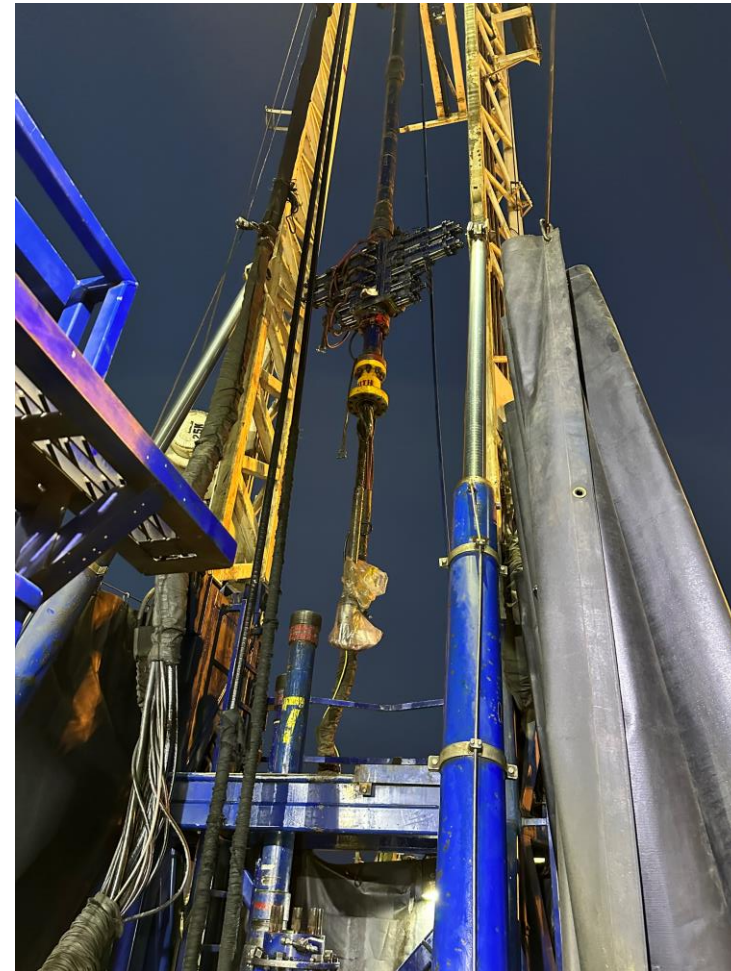
Barrier Verification Log

- Verification Log was required on first deployment to validate operational parameters
- Log run on wireline offline
- Results accepted



Potential Impact of Coiled Tubing Operation

- PWC® Operation completed in ~20 hours
– Safely, Successfully
- Coil Tubing Deployment Eliminated
approx. 5 days of rig time
- Estimated Emissions Reduction of 100mT
CO₂
- Overall Cost of Slot Recovery preparation
reduced by approx. 25%





Thank you

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